

# Winegard® Dealer Training

## Over-the-Air (OTA) TV Antennas

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Multicasting is the transmission of multiple OTA channels on the same digital signal. A broadcast station may multicast multiple sub-channels in addition to the primary channel. For example, a station normally broadcasts the regular newscast on its primary channel, 6-1. On a sub-channel, 6.2, the same station broadcasts live radar.

To find the best reception with a portable OTA antenna such as the Rayzar antenna, the antenna should be tried in multiple locations, and a channel scan should be run in each location.

First time users must run a channel scan after connecting the antenna to the TV in order to receive maximum programming. Run a channel scan anytime the antenna is in a new location, as well.

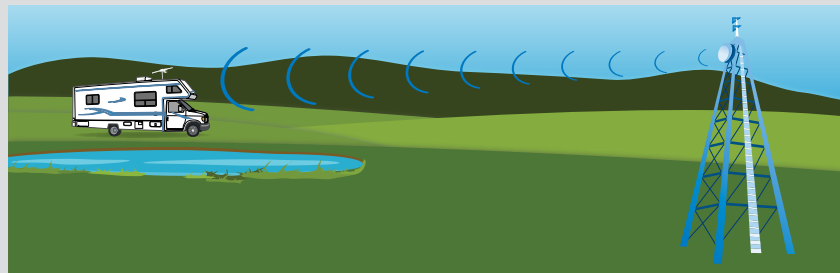
A new scan will find any new channels that have been added in the your area as well as finding any channels that have changed or moved. While the steps to perform a channel scan may vary from TV to TV, below are some general guidelines to follow. For more specific instructions, refer to your television owner's manual for assistance.

Complete the following steps to run a channel scan:

1. Using the television remote that came with the TV or converter box, select "Menu."
2. Select "Channel Setup" (if you have a converter box, skip to step #4).
3. Select "Antenna" or "Off-Air Mode" or "Auto Scan."
4. Select "Channel Search" or "Channel Scan." Scan time will vary based on the number of channels available in your area.

## Over-the-air Programming

Over-the-air (OTA) programming is programming that is transmitted wirelessly by local broadcast stations. OTA programming is transmitted on VHF (very high frequency) or UHF (ultra high frequency) bands and received by OTA antennas, which send the signal via coax cable to the television. The advantage of OTA programming is that the programming is multicasted in pure, uncompressed, free HD.



**FIGURE 4.1.** Transmission of signal from broadcast tower to antenna on RV

## Receiving Programming with an OTA Antenna

To receive maximum programming, the OTA antenna should be pointed in the direction of (a) broadcast tower(s). Depending on the antenna, the antenna may be pointed between broadcast towers to receive programming from multiple broadcast towers. Omnidirectional antennas receive signal from all directions and therefore do not need to be pointed. Once the antenna has been pointed, a channel scan should be run on the TV. To keep the channel line-up up-to-date, a channel scan should be run anytime the antenna is in a new location.

## OTA Channels

OTA antennas can receive programming from the major local broadcast networks (e.g., ABC, CBS, FOX, NBC, PBS) plus additional networks (Qubo, ION, The CW, This TV, MyNetworkTV, Azteca, Telefutera, Univision, and Telemundo). OTA antennas can also receive local news, weather, and educational programs that satellite and cable don't offer. The number of channels will vary by location. Generally, if you are in or near a metropolitan area, you will receive more channels than if you are outside a metropolitan area. Keep in mind that antenna reception may vary based on terrain (including trees, building, hills, and mountains). The fewer obstructions, the better your chance for receiving strong digital signals.

# Overview

## Winegard OTA Antennas

Winegard offers a variety of OTA antennas for mobile applications. The primary OTA antennas that Winegard offers for mobile applications include the Rayzar Automatic, Sensor, Wingman®, Rayzar Air, Rayzar Indoor Portables, and RoadStar antennas.

**TABLE 4.1.** Available Winegard OTA TV Antennas

Rayzar Automatic



Automatic Directional Amplified TV antenna eliminates the hassle of searching for available TV signals by automatically tuning in where most channels are found. Features an ultra sleek profile and dome protects elements from harsh environmental conditions.

Sensor IV



VHF/UHF digital roof-mounted antenna with a range\* of up to 55 miles. The Winegard Sensor IV antenna (shown) includes an integrated Wingman antenna.

Wingman



Optional accessory for Sensor III antenna that attaches to antenna, optimizes antenna for UHF channels, and increases UHF performance up to 100%.

Rayzar Air



High-band VHF & UHF digital roof-mounted antenna that is amplified and bi-directional. The antenna is offered in black and white models as a standalone or retrofit kit to replace an existing Sensor antenna.

Rayzar Indoor Portable



Ultra thin, portable HDTV antenna that is available in amplified and non-amplified models. Amplified models include attached USB power supply, 3' USB cable, 12 V adapter and 110 V wall adapter.

RoadStar



VHF/UHF amplified omni-directional outdoor TV antenna with a range\* of up to 35 miles. Models are available in black or white models.

\*Antenna mileage figures are based on average terrain. Actual receiving distance will vary based on transmitting power, transmitting antenna tower height, pattern of transmitter, height of receiving antenna, weather conditions and terrain between receiving path including trees, buildings, hills, mountains, etc.

Sensor III



**FIGURE 4.2.**

Add the Wingman for increased UHF reception with the Sensor III.

Winegard also offers the SensorPro TV signal strength meter as an accessory for the Sensor and Rayzar Air antenna. The signal meter simplifies the search for digital signal and displays the signal strength for channels (see fig. 4.2).



(Back)

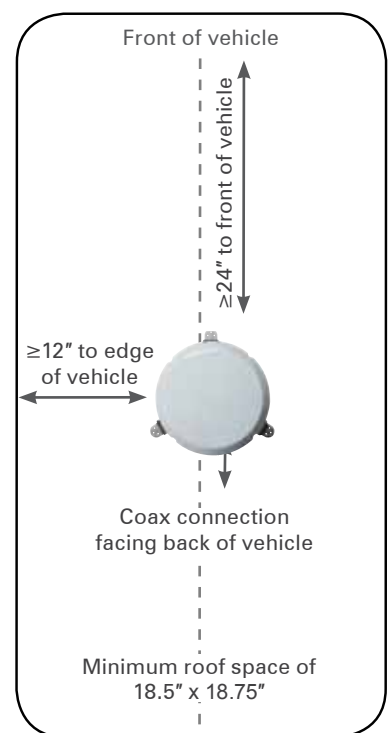
**FIGURE 4.3.** SensorPro TV signal strength meter and a 2<sup>nd</sup> booster adds more amplification.



**FIGURE 4.4.** Rayzar Automatic

Do not attempt to install this system in the rain or under any wet conditions.

Specifications:  
VHF/UHF Amplified antenna:  
Height: 7"; Weight: 4.5 lbs  
UV-protected plastic dome  
Operating Voltage: 10 – 13.8 VDC  
Operating Current:  
Park Cable Mode (Off): 10 mA  
Active: 500 mA  
Sleep Mode: 80 mA  
For stationary use only.



**FIGURE 4.5.** Roof requirements

Rotate the antenna so that the coax connection is facing the back of the vehicle.

## Installing the Antenna

Choose a location on the roof of the RV for the antenna that meets the requirements shown in Figure 4.5.

After confirming that the antenna in its chosen location meets all requirements, trace around each base foot. Position the antenna with the coax facing the rear of the vehicle.

Installing the antenna on or near metal objects may cause signal interference. For optimal performance install in a location free of obstructions.

Clean the roof area where the base feet will attach to the roof; do not erase your marks.

Apply approved sealant in the areas marked for the base feet.

Align the antenna feet with the areas marked for the base feet, and place the antenna on the sealant.

Install three mounting screws per antenna foot, and tighten.

## Routing Cables

Connect the included coax cable to the F-jack on the antenna base.

Note: a 20 foot coax cable is included and recommended for use with the antenna. Longer coax runs could potentially cause problems with antenna performance. Maximum cable length should never exceed 30 feet.

Route the coax cable through the roof and ceiling to the chosen location for the power supply

Place the cable entry plate over the hole and cable.

Screw the plate in place with up to seven screws.

Apply sealant (not included) over the edge of the cable entry plate and screws.

# Rayzar Automatic Antenna

## Installing the Control Panel.

Choose a location for the control panel. Drill a 2" hole, centered, to allow for installation of control panel power and coaxial connections.

Connect the coax cable from the antenna to the "ANT IN" port on the control panel, and tighten until fingertight. (The coax cable should have been routed through the ceiling and wall to the chosen control panel location.)

Connect a coax cable from either the port on the front of the control panel or the "TV OUT" to the television. If connecting to TVs in multiple locations both TV outputs can be used or a splitter may be used.

If hooking up a cable input, connect the cable from the cable input to the "CABLE IN" port on the back of the control panel.

Run two #12 wires between the control panel and +12 VDC source, and route downlead cable to the chosen location for the control panel.

Install terminals on wires from +12 VDC source, and crimp the terminals with an appropriate crimping tool. Make 12 volt connection to the control panel.

Mount the control panel in the wall with the provided control panel screws.

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If removing an existing antenna, supplied with this antenna is a roof cover plate and ceiling cover plate. Make sure to properly seal the roof plate to the roof, including around the supplied grommet. The ceiling plate can mount to ceiling after removing existing crank handle. Mount the ceiling plate bracket to ceiling with 2 screws. Ceiling plate is paintable, if desired.

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Do not remove dome or any internal components without direct instruction from Winegard Technical Service. Removing components can cause cable wrap to malfunction, causing permanent damage to antenna. Do not run antenna without the dome in place and secured. Failure to follow these instructions can void the product Warranty.

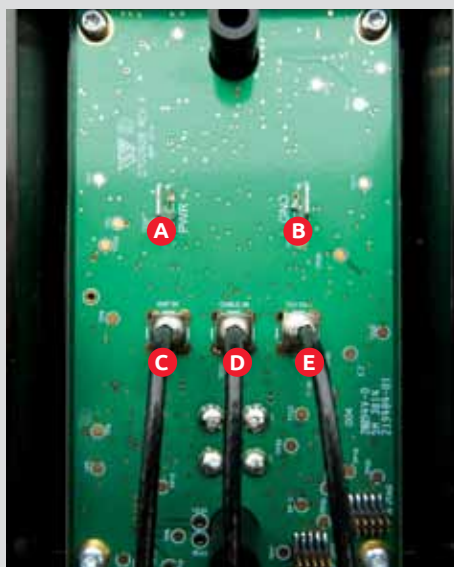
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To avoid electrical short, coaxial pigtails must hang free and clear of the Rayzar Automatic control panel electronics.

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Back of Control Panel



- A) Power +
- B) Ground
- C) Antenna In
- D) Cable In
- E) TV Out

**FIGURE 4.6.** Control Panel



## Cable Mode

When the control panel is powered off, park cable signals will be passed to the TV. In this mode all LEDs are turned off.

## Antenna Mode

When the Control panel is powered on by pressing the On/Off button, the LEDs will flash and begin its power on process. At this time the antenna amplifier is powered on and TV antenna signals will be passed. Initially, GREEN "Positional LED(s)" will be lit to indicate the direction the antenna is positioned.

## Sleep Mode

While in Antenna Mode, if no buttons are pressed for 3 minutes, the system will enter into Sleep Mode. During Sleep Mode the POWER LED will remain lit and the antenna amplifier will remain on, allowing the user to watch TV. All other LEDs will be turned off.

## Positional LEDs

Top of wall plate is front of RV, bottom is back of RV

## Green LEDs

Indicate antenna position. If 2 green LEDs are lit, the antenna is positioned between those positions.

## Red LEDs

Indicates optimal pointing location(s) found during search. Antenna will automatically move to the best result. Pressing SEARCH again will move between alternate positions.

## RED/GREEN LED

If both the RED and GREEN LEDs are lit on the same spot, that indicates the current location, as well as an optimal pointing location.

## Operating the Automatic Search Control Panel

The system does not move until the Search button is pressed. Channels will be received whenever the system is powered on.

To begin a new search, press the Search button. The antenna will go through its initialization process and begin searching for TV frequencies. A typical search will take 2-3 minutes. A RED LED will quickly cycle through the positional LED position to indicate the antenna is moving and direction it is moving.

After the search is complete, the antenna will automatically go to the position which results in the most watchable TV channels. The 2-digit display will show the number of frequencies seen at that position, and both the GREEN and RED LED(s) will be lit to indicate the successful search location. Additional RED LEDs will also light to show any other channels found at alternate positions. Pressing the Search button again will move the antenna to the next best location. Continuing to press Search again will cycle through other positions that provided additional channels, until returning to the main search location.

To clear search results and initiate a new search, press and hold the Search button for 2 seconds. The system will also clear all search results each time it is powered off.



**FIGURE 4.7.** Antenna Control Panel

# Rayzar Automatic Antenna

## Manual Control

The Rayzar Automatic antenna also allows the user to move the antenna with a manual control function. This can either be used for fine tuning a channel that may be pixelating, or used as a manual search method in a known location. Pressing the rotate buttons will move the antenna in small increments. The GREEN LED will show the antenna position. If 2 adjacent GREEN LEDs are lit, the antenna is positioned half way between the corresponding LEDs.

Pressing the search button after using manual controls will return the antenna to Automatic Search Mode and move to the next best stored location.

## Troubleshooting

Below is a list of possible Error Codes displayed during operation. The Error Code would be displayed on the 2-digit readout during use. Refer to the table below for possible codes and actions to resolve the errors.

**TABLE 4.2.** Error codes for troubleshooting

ERROR CODE	CAUSE	ACTION
<b>E1</b>	Short in Coax Between Control panel and antenna.	Check all cables and connections then perform RESET function on control panel or disconnect 12V.
<b>E2</b>	No antenna detected.	Check all cables and connections to antenna.
<b>E3</b>	Motor Movement Error.	Antenna may still function. If problem persists contact Winegard Technical Service.
<b>E4</b>	Tuner Error. Controls and antenna will still function.	Perform RESET function on control panel. If problem persists contact Winegard Technical Service.
<b>E5</b>	Factory Mode.	Perform RESET function to exit Factory Mode and return to normal operation.

An E3 error could be a result of a malfunction in the cable wrap. The simplest way to check the cable wrap is to remove the motor from the rotating base, and make sure the system can rotate freely 360 degrees with the cable tie connected to the rotating base.

If an E4 error occurs, the system will not be able to search, however the user can still use the manual controls to position the antenna, and the antenna and amplifier will still be functional.

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While in manual mode, if the readout displays "HS", that means the antenna has reached the operational limit and needs to rotate the other direction.

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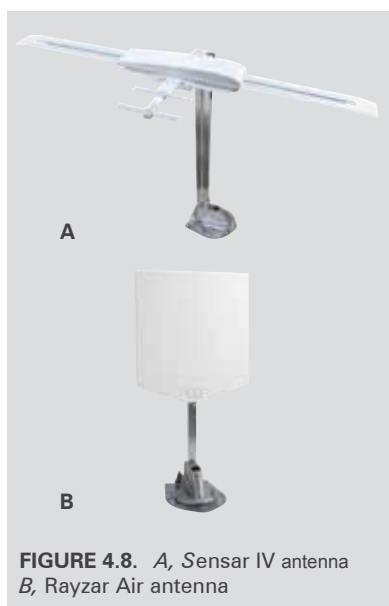
Pressing the Search and Counter Clockwise Rotate button at the same time will perform a reset on the system. This can be used to trouble-shoot the system, as performing a reset can clear errors.

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There are 2 LEDs on the electronics inside the dome. The LED nearest the coaxial connection indicates the electronics is receiving power from the controller inside the RV. The other LED indicates a successful "self check" on startup, indicating that everything is running as expected.

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## Roof Location Requirements

The Sensar and Rayzar Air antennas use the same mounting bracket and therefore have similar installations. Before installing the antenna, contact your RV manufacturer. Your RV may be pre-wired or have a reinforced area for the system.

Choose a location on the roof for the antenna, noting that the length of the antenna must be parallel to the centerline of the vehicle. The chosen location must meet the clearance requirements for the antenna: a minimum distance of 24" to the front of the vehicle, a minimum distance of 16" to the edge of the roof, a minimum distance of 16" (from the Sensar antenna) or 12" (from the Rayzar Air antenna) to the nearest obstruction. Additionally, there should not be any obstructions that prevent the antenna from raising and rotating. Check that the inside ceiling area is clear for mounting the ceiling plate.

## Installing the Mounting Bracket and Crank

After choosing locations on the roof for the antenna to be installed and for a cable to enter the vehicle, drill a 1 3/4" hole through the roof and ceiling for the antenna mount, and drill a 1/2" hole through the roof for the cable. A template is provided at [http://www.winegard.com/kbase/upload/sensar\\_template.pdf](http://www.winegard.com/kbase/upload/sensar_template.pdf).

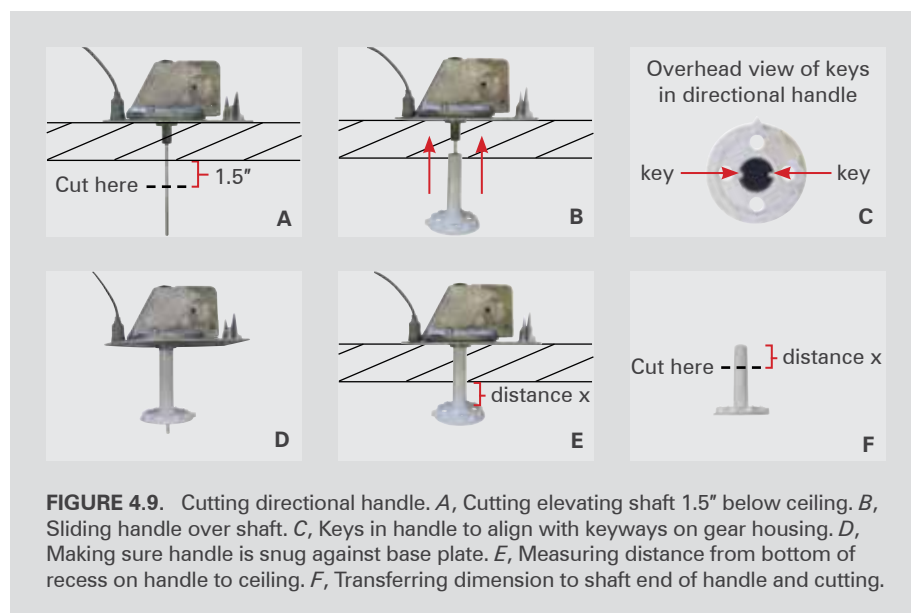
The mount can fit roofs 1"-4 3/4" thick and with Model EK-1036 directional handle extension, the mount can fit roofs up to 7" thick. If the roof is less than 4 3/4" thick or if the extension is used, the directional handle must be cut to size (see fig. 4.9).

Do not attempt to install this system in the rain or under any wet conditions.

If installing a Sensar or Rayzar Air antenna on a sloped or rounded roof, use Winegard model RW-2000 exterior roof wedge or model IW-5000 interior roof wedge in order to level the installation. The roof wedge must be put in place before installing the base plate or interior hardware.

Be careful not to damage wiring when drilling through the roof and/or ceiling.

If using Winegard Model EK-1036 directional handle extension, excess length must be cut from the directional handle, and the handle and extension must be glued together to work properly. PVC glue is recommended.





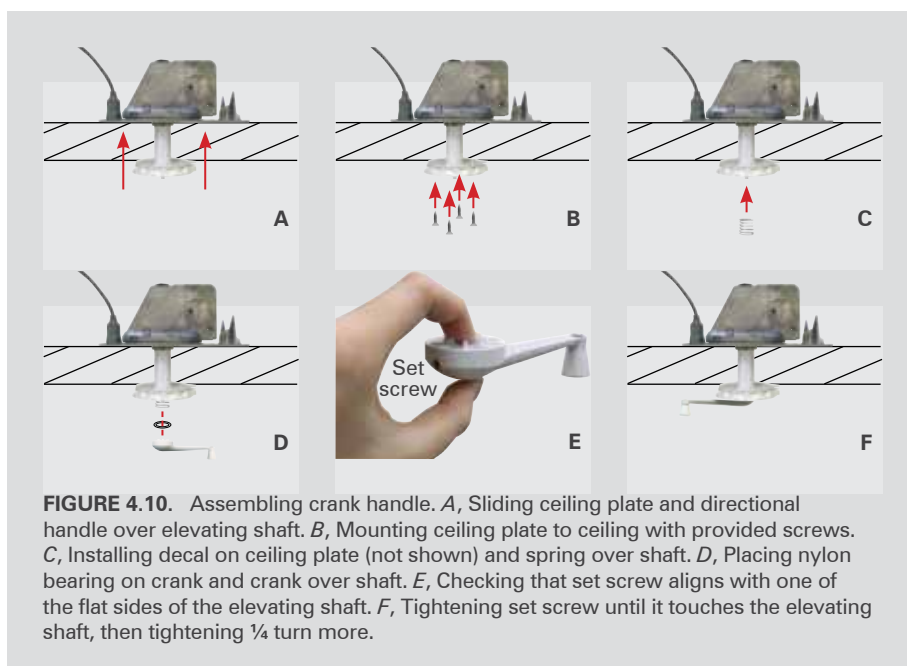
# Sensar & Rayzar Air Antennas

## Installing the Mounting Bracket and Crank, Cont.

Next, align the holes in the gear housing, elevation gear, and the lift tube(s)/boom(s). Insert a steel pin into the holes, and secure each pin with an e-clip. The coax cable should be attached to the F-jack on the antenna head.

Once the antenna is in the chosen location, apply nonhardening sealant to the bottom of the base plate and to the perimeter of the hole drilled for the antenna. Carefully place the base directly onto the sealant. Screw the base to the roof with the provided screws, and apply sealant over the screws, as well (see fig. 4.14).

Align the pointers of the directional handle and ceiling plate, and then proceed with installing and assembling the rest of the crank handle (see fig. 4.10).

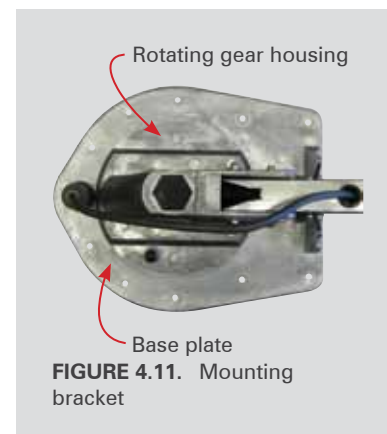


## Wiring the Antenna

Once the mount base has been properly installed, select a location for the wall plate/power supply. Keep in mind that the antenna download must be routed through the ceiling to the location of the power supply.

The power supply may be flush mounted into a hole size of most standard electrical boxes. To flush mount, cut a hole in the wall to fit the box. Run two #12 wires between the wall plate and +12 VDC source, and route download cable to this location.

Do not get sealant on the bearing surface between the base plate and rotating gear housing (see fig. 4.11). Do not paint the top of the base plate or around the rotating gear housing.



Once the set screw touches the elevating shaft, tighten the screw only  $\frac{1}{4}$  turn more. The set screw simply holds the crank on. Do not overtighten.

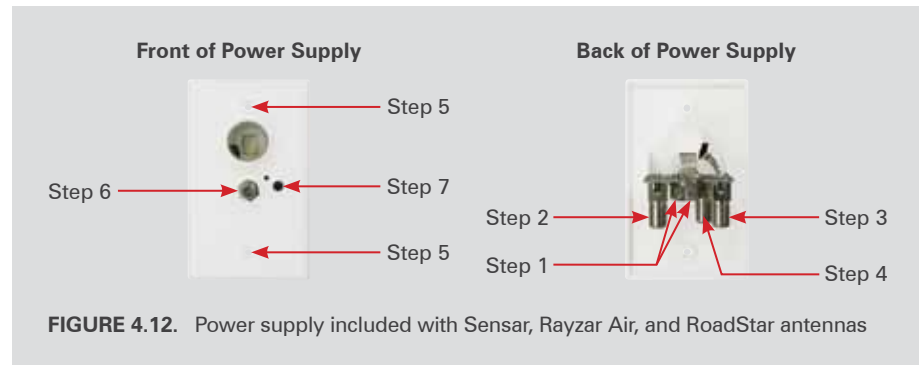
Make sure the power supply is off before connecting cables or wires.

High current devices (such as hair dryers) should not be connected to the power supply. Maximum current rating of receptacle is 8 amps at +12 VDC.

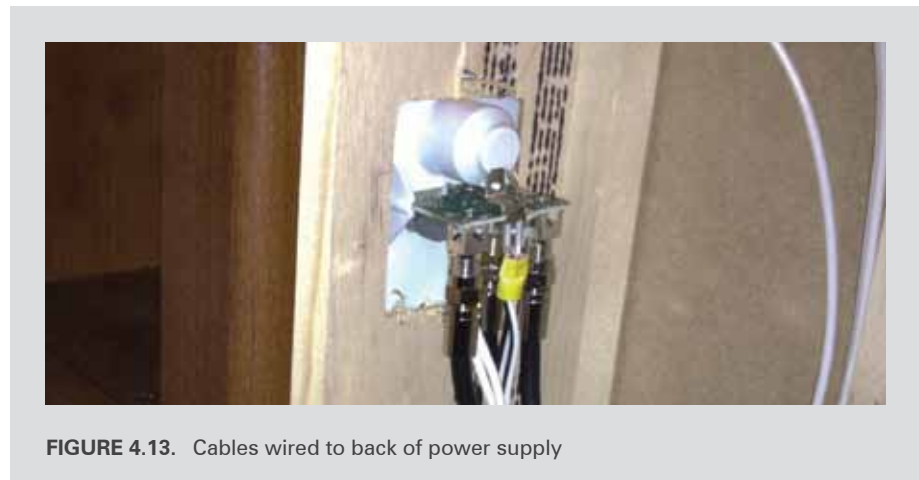
If in doubt as to the polarity of the wires, connect the wires temporarily to the tabs, and press the “ON” switch on the front of the wall plate. If the light turns on, the polarity is correct. After checking the polarity, turn the power off.

## Wiring the Antenna, Cont.

Complete the following steps to wire the power supply (see fig. 4.12):



1. Make 12 V connection to the power supply. Install terminals on wires from +12 VDC source, and crimp the terminals with an appropriate crimping tool.
2. Connect the coax cable from the antenna to the “ANTENNA” port on the power supply, and tighten until fingertight.
3. If hooking up the antenna to a second television, connect a coax cable from the “SET 2” port on the back of the power supply to the “Antenna In” port on the second television.
4. If hooking up a cable input, connect the cable from the cable input to the “CABLE” port on the back of the power supply (see fig. 4.13).
5. Mount the power supply with the provided screws.
6. Connect a coax cable from the coax port on the front of the power supply to the “Antenna In” coax port on the TV.
7. Press the “ON” switch on the front of the power supply, and check that the light is on.



# Sensar & Rayzar Air Antennas

## Operating the Sensar & Rayzar Air Antennas

To operate the Sensar antenna, complete the following steps:

1. Raise the antenna by turning the elevating crank clockwise in the “UP” direction for about 13 turns or until some resistance is noted.
2. Press the “ON” switch on the front of the power supply.
3. Make sure the antenna is deployed. Then, pull down to disengage the ceiling plate, and rotate the directional handle until the antenna is pointed for optimal reception. Run a channel scan to determine the position with the best reception. See page 1 for more information on running a channel scan.
4. Once ready to travel, rotate the directional handle to align with the stow position on the ceiling plate. Turn the elevating crank counterclockwise in the “DOWN” direction about 13 turns or until some resistance is noted.



**FIGURE 4.14.** Sealing Sensar antenna on roof of RV

## Maintenance

For satisfactory operation of the Sensar or Rayzar Air antenna, the unit needs to be lubricated every six months or when the antenna becomes difficult to elevate or rotate. This can be done by raising the antenna to a 45 degree angle and flooding the gears with lubricant (see fig. 4.15). Also, be sure to lubricate around the base of the turret assembly and inside the plastic cap on the turret assembly.

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Like satellite signal, digital signal may be blocked by trees, buildings, etc. For the best signal reception, avoid obstructions between the antenna and broadcast tower.

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For lubrication purposes, use a silicone based lubricant. Do not use a solvent such as WD-40, as this will dissolve the seal that protects the interior of the coach from water leakage.

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Lubricate the Sensar antenna every six months by raising the antenna to a 45 degree angle and flooding the gears with lubricant (see fig. 4.12).

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**FIGURE 4.15.** Lubricating the Sensar antenna

Consult the Rayzar Air retrofit kit manual for specific instructions on replacing an existing antenna with the Rayzar Air antenna.



## Rayzar Air Retrofit Kit

The Rayzar Air retrofit kit has been designed to replace an existing antenna that uses Winegard's standard lift assembly/mounting bracket. This includes the Rayzar Air and Sensar line of antennas. The Rayzar Air retrofit kit includes a 16" boom, but the replacement head can be installed using the included boom or using the existing boom from the existing installation. A summary of each installation option is below.

### Replacing an Existing Antenna using the Included Boom

This is the recommended installation. In this installation, the Rayzar Air replacement head is attached to the included 16" boom with two supplied bolts. Then, the coax cable is disconnected from the existing antenna, and the e-clips and pins from the existing lift arms are removed, before removing the existing lift arms. If replacing a Sensar antenna, the coax cable must be pulled through the elevation tube and will require the connector to be cut off to do so. The elevation gear from the existing antenna is then inserted into the end of the Rayzar Air replacement antenna. The Rayzar Air replacement assembly is connected to the lift assembly via pin and e-clip, and the replacement is complete once the coax cable has been fit with a connector and reconnected to the F-jack on the Rayzar Air antenna head.

### Replacing an Existing Antenna using the Existing Boom: Securing Antenna Head with Two Bolts

First, raise the antenna, and remove the pins and e-clips that connect the existing antenna head to the booms. Then, identify the boom that does not have coax cable running through it, and remove the pin and e-clip to remove the boom. Place the Rayzar Air antenna head assembly on the remaining boom, and insert a bolt through the aligned holes in the antenna head assembly and boom. Use a drill with a 9/32" bit to drill through the second set of holes in the Rayzar Air antenna head assembly and through the boom. Insert a bolt through the drilled hole, and connect the coax cable to the F-jack on the antenna head.

### Replacing an Existing Antenna using the Existing Boom: Securing Antenna Head with One Bolt

To replace an existing antenna with the Rayzar Air antenna head, raise the antenna, and remove the pins and e-clips that connect the existing antenna head to the booms. Then, identify the boom that does not have coax cable running through it, and remove the pin and e-clip to remove the boom. Place the Rayzar Air antenna head assembly on the remaining boom, and insert a bolt through the aligned holes in the antenna head assembly and boom. Connect the coax cable to the F-jack on the antenna head.



# Sensar & Rayzar Air Antennas

## Leak Testing

1. Crank up the antenna to a 45 degree angle.
2. Remove all of the interior parts.
3. Slowly pour water over the gears and gear housing.
4. Observe the inside of the RV to determine if water is leaking into the RV.
  - If the ceiling is getting wet, then there the base is leaking and needs to be sealed.
  - If the water is dripping from the hex shaft, then the o-ring (dual quad ring) around the worm gear is leaking and needs to be replaced. Replace the dual quad ring, the wavy washer and the flat washer with RP-4000.

If replacing the dual quad ring, make sure to remove the existing dual quad ring from the seat in the gear housing. If the cranking mechanism is difficult to turn after reassembling the worm gear and inserting the gear into the gear housing, then the old/existing dual quad ring was most likely not removed before installing the replacement dual quad ring.

## Troubleshooting

The process below will verify functionality of the wall plate/power supply and the coaxial cable that runs from the antenna to the wall plate.

1. Turn on the wall plate/power supply by pressing the On/Off button, and verify that the light is on. If the light does not come on, verify that there is 12 VDC present on the power connection. If there are voltages, make sure the "+" and "-" are properly connected; the centermost terminal is the "+" terminal. If the light is still not lit, it is possible that the light is burnt out. The wall plate will still function with a burnt out light.
2. On the roof, disconnect the coax cable from the antenna head. Inspect for corrosion. With a DC voltmeter or 12 V test light, measure the voltage on the coax cable. Put the ground lead (black) on the outside of the connector and the positive lead on the center conductor of the coax. The voltage on the coax cable should be approximately 12 VDC.  
If you have voltage at the antenna head, this indicates that the wall plate and coax cable are working properly. This could mean that the amplifier in the antenna head is defective. The amplifier cannot be replaced; a new antenna is required.
3. If there is not 12 VDC at the antenna head, then measure the voltage at the back of the wall plate. Remove the wall plate from the wall, and disconnect the coax cable that runs to the antenna. With the wall plate on, measure the voltage at this jack. The voltage at the "ANTENNA" port should be approximately 12 VDC.

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Troubleshooting steps, hints, and tips listed apply for the Sensar, Rayzar Air, and RoadStar antennas. These antennas use the same wall plate/power supply.

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## Troubleshooting, Cont.

Note: do not insert the probe of the meter or test lamp into the coax jack. Instead, insert a small diameter wire or unfolded paper clip into the jack. The large diameter probe will permanently damage the connector. Put the ground (black) lead on the outside of the jack and the positive (red) lead on the wire or paper clip that was inserted previously.

If there is voltage at the "ANTENNA" jack but no voltage on the roof, then the problem is in the coax cable between the "ANTENNA" port and antenna head. Check all in-line connections between the wall plate and antenna. Also, replace any connectors that show signs of wear. If there is no voltage at the "ANTENNA" coax jack on the back of the wall plate but the light is on, the wall plate/power supply is defective and should be replaced.

## Troubleshooting Hints and Tips

If the light on the wall plate turns on and then turns off after a few seconds, there may be a short in the coax cable or the antenna head. To determine the location of the short, disconnect the coax cable from the antenna head, and check the light. If the light stays on, the antenna head has shorted. If the light turns off, leave the antenna head disconnected, and disconnect the coax cable from the back of the wall plate switch. Re-check the light. If the light remains turned on, there is a short in the coax cable.

If the light turns on but there is no power to the 12 V outlet (e.g. cigarette plug receptacle), inspect the connection on the back of the outlet for melting. Melting may occur if the outlet was used for appliances other than a TV set or if a loose connector was plugged into the outlet.

If the wall plate has a red light, check the back of the front coax connection to see if the pin is bent over and shorting out the connector.

If you are receiving VHF channels (2–13) but not UHF channels (14–51), then make sure the TV set has been set to "Antenna" and not "Cable" in the TV setup menu. Note that terminology in menus will vary between TVs.

Before breaking the seal on the base plate boot, substitute a known good piece of coax cable between the head and the wall plate switch by running it through a door or window to verify where the problem is occurring.

To determine if there is a problem with the coax from the wall plate switch to the television set, substitute a known good piece of coax cable from the front jack on the wall plate directly to the input jack on the TV set.

# RoadStar Antenna

## Warning

Do not snap the antenna head and pedestal together until after the pedestal has already been installed on the roof!

## Roof Location Requirements

Choose a location for the wall plate/power supply. Keep in mind that a coax cable will have to run from the antenna to the power supply and from the power supply to each television. A 12 V connection must also be made to the power supply.

Then, choose a location for the antenna that meets the clearance requirements of the antenna: a minimum distance of 24" from the center of the antenna to the front of vehicle and a minimum distance of 18" from the center of the antenna to the nearest obstruction and to the edge of the roof.

## Choosing a Mounting Option

The RoadStar antenna can be mounted two different ways. The antenna can be mounted with the coax cable running down through the pedestal and directly into the ceiling (Mounting Option 1), or the antenna can be mounted with the coax cable running out the side of the pedestal and into the ceiling via a cable entry plate (Mounting Option 2). Choose a mounting option based on the desired point of cable entry.

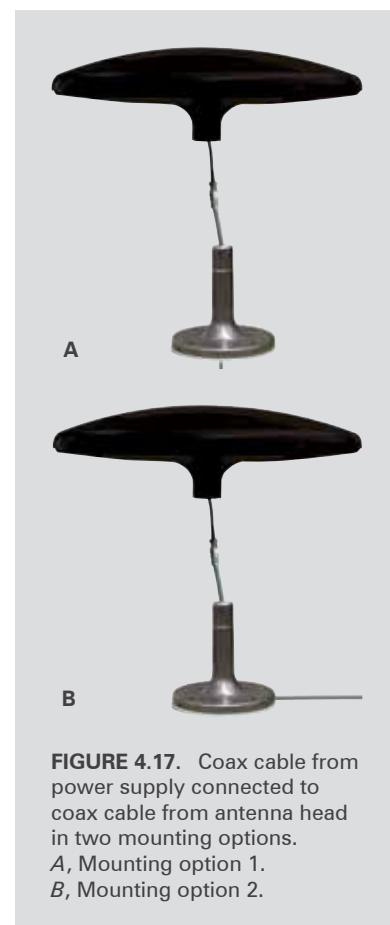
## Mounting Option 1 Tips

If installing the RoadStar antenna so that cables enter the vehicle directly beneath the antenna, consider the following tips:

1. Run a coax cable up through the ceiling, gasket, and pedestal, and connect to the cable running from the antenna head (see fig. 4.17A).
2. Place the rectangular gasket in the slot on the underside of the pedestal.
3. After sealing the pedestal to the roof, push the cable slack downward through the pedestal.
4. Twist the antenna head back and forth while pushing it onto the pedestal. The pedestal should engage with the snap ring inside the antenna head.
5. While applying pressure, rotate the head until feeling the grooves in the head line up with the grooves in the pedestal.
6. Push down again; you should hear the head click into place. Check that the scribe line on the pedestal is no longer visible and that the antenna head is fully seated. If the scribe line is visible, the head is not fully seated on the pedestal. Repeat steps 4–6 to connect the antenna head to the antenna pedestal.

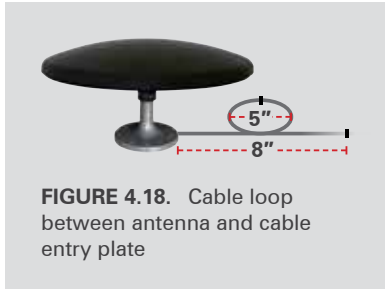
Once the antenna head has been snapped onto the pedestal, the antenna head cannot be removed without incurring damage.

Depending on the desired point of cable entry, the coax cable can be run two different ways during installation (see fig. 4.10).



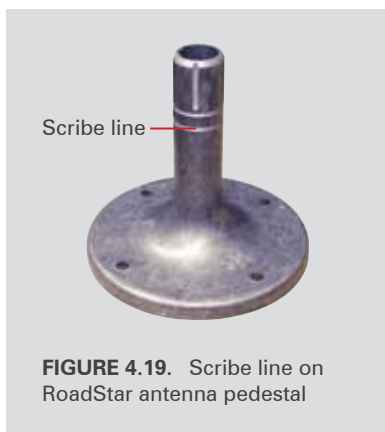
**FIGURE 4.17.** Coax cable from power supply connected to coax cable from antenna head in two mounting options. A, Mounting option 1. B, Mounting option 2.

If installing the antenna so that cables enter the vehicle via a cable entry plate, leave enough slack to make a cable loop of at least five inches in diameter (see fig. 4.18).



**FIGURE 4.18.** Cable loop between antenna and cable entry plate

A scribe line on the pedestal aids in determining if the antenna head is fully seated on the pedestal. If the scribe line is still visible after pushing the antenna head onto the pedestal, the head is not fully seated on the pedestal (see fig. 4.19).



**FIGURE 4.19.** Scribe line on RoadStar antenna pedestal

## Mounting Option 2 Tips

If installing the RoadStar antenna so that cables enter the vehicle via a cable entry plate, consider the following tips:

1. Note that the antenna must be at least eight inches from the cable entry plate, and enough cable slack must be left to make a loop of at least five inches in diameter (see fig. 4.18).
2. Run the cable upward through the pedestal, making sure the cable runs through the slot on the underside of the pedestal, and connect to the coax cable running from the antenna (see fig. 4.17B).
3. Push the cable slack downward through the pedestal, and gently pull the cable through the slot.
4. Twist the antenna head back and forth while pushing it onto the pedestal. The pedestal should engage with the snap ring inside the antenna head.
5. While applying pressure, rotate the head until feeling the grooves in the head line up with the grooves in the pedestal.
6. Push down again; you should hear the head click into place. Check that the scribe line on the pedestal is no longer visible and that the antenna head is fully seated. If the scribe line is visible, the head is not fully seated on the pedestal. Repeat steps 4–6 to connect the antenna head to the antenna pedestal.
7. Gently pull the coax cable away from the antenna.
8. At a point four inches from the antenna along the excess cable, create a loop of five inch diameter between the antenna and cable entry plate (see fig. 4.18). Clamp at the top of the loop, at a point eight inches from the antenna, and every 12–16" thereon along the cable.

## Wiring the RoadStar Antenna

For instructions on wiring the wall plate/power supply, refer to page 4, “Wiring the Sensor Antenna.” The same wall plate/power supply is supplied with RoadStar and Sensor antennas.

## Operating the RoadStar Antenna

The RoadStar antenna is an omnidirectional antenna that does not require cranking or rotating to find the best signal. To operate the antenna, simply turn on the wall plate/power supply, and run a channel scan.

# Rayzar Antenna

## Setting up the Rayzar Antenna

The Rayzar antenna is not weatherproof and should not be installed outdoors in rain, snow, excessive wind, etc.

The non-amplified Rayzar antenna includes an attached mini coax cable and two quick-release suction cups. The amplified Rayzar antenna includes an attached mini coax cable with USB power supply, two quick-release suction cups, a 3' USB cable, 12 V adapter, and 110 V wall adapter.

To set up the portable Rayzar antenna, complete the following steps:

1. Connect the mini coax cable to the “Antenna In” port on the TV or compatible device.
2. If setting up an amplified Rayzar antenna, then plug the mini USB into the “USB PWR” port of the amplifier (see fig. 4.20A). Then, plug the regular USB into the USB port of the TV, 12 V adapter, or 110 V adapter (see fig. 4.20B). If plugging the USB into the 12 V or 110 V adapter, then plug the adapter into a 12 V or 110 V outlet, respectively.
3. For optimal reception, position the antenna toward broadcast tower(s).
4. Run a channel scan.
5. If not satisfied with the channels found, reposition the antenna, and re-run a channel scan. Make sure to run a channel scan every time the antenna changes positions.



**FIGURE 4.20.** Hooking up the Rayzar antenna. A, Connecting mini coax cable to “Antenna In” port on TV. B, Mini USB connected to “USB PWR” port of amplifier and Regular USB plugged in to TV for amplified Rayzar antenna setup.

Upon determining the best location for the antenna, use the quick-release suction cups to mount the antenna in the desired location. Secure the suction cups to opposite corners of the antenna, and slightly offset the suction cups from the corners. The antenna can be mounted vertically or horizontally.



**FIGURE 4.21.** Rayzar antenna

The Rayzar antenna is a lightweight (0.34 lb), portable antenna that does not require assembly or permanent installation, making it ideal for RVs with limited or no roof space as well as for outdoor activities such as tailgating. However, the Rayzar antenna should not be installed in inclement weather.

For a listing of likely channels available in the area, go online to [dtv.gov/maps](http://dtv.gov/maps).

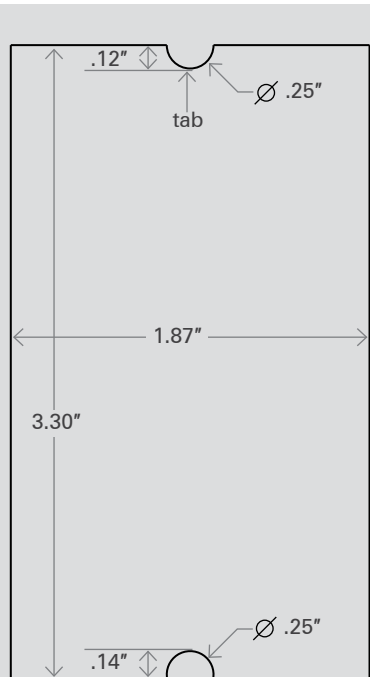
Avoid mounting the antenna on metal objects because such objects can obstruct signal. For optimal reception, try mounting the antenna on a window that faces broadcast tower(s) (see fig. 4.22).



**FIGURE 4.22.** Mounting the antenna on a window



To install the signal meter, cut a  $3\frac{5}{16}$ " x  $1\frac{7}{8}$ " section in the wall for the signal meter. If not using an electrical box, cut out the tabs, or screw the provided spacer into the installation location. The signal meter will extend one inch into the surface to which it is mounted.



**FIGURE 4.23.** Template for SensarPro signal meter installation

On the SensarPro signal meter, the upper display shows signal strength, and the lower display shows channels. The channel number displayed on the signal meter may not match the virtual channel number displayed on the TV.

Input voltage for the SensarPro signal meter must be between 9 and 16 VDC with a maximum draw of 500 mA.

## Installing the SensarPro Signal Meter

Before installing the SensarPro signal meter on an interior wall, keep in mind that the signal meter must be accessible and must connect to the Sensar antenna, television, and 12 VDC power. After choosing a location for the antenna, cut a  $3\frac{5}{16}$ " tall by  $1\frac{7}{8}$ " wide section in the wall for the signal meter. If not using an electrical box, cut out two tabs, or use the provided spacer.

Identify the four labeled cables on the back of the signal meter, and hook up the cables according to the following steps:

1. Connect the cable running from the antenna to the "ANT IN" RF connection on the back of the signal meter.
2. Connect a cable from the "Antenna In" port on the TV to the TV1 RF connection on the signal meter. Follow the same step for connecting a second TV to the TV2 RF connection.
3. If the RV is wired for Park Cable connection, connect the Park Cable cable to the Cable In RF connection.
4. Connect the signal meter to 12 VDC. The power should be connected to the "+" post, and the ground should be connected to the "-" post.
5. Feed the cables back into the wall, and align the mounting holes on the wall plate with the tabs (or the holes in the spacer if the spacer was installed).
6. If a new installation, pre-drill the mounting holes. Then, secure the signal meter to the wall with two screws.

## Operating the SensarPro Signal Meter

Once wired, press the Select button to turn on the signal meter; the light next to "ANTENNA-SCAN" should be on, and the Sensar antenna should be deployed. In Scan mode, the signal meter will display the channel with the strongest signal in the lower display and the corresponding signal level in the upper display. Press an arrow to re-scan. Note that the (RF) channel numbers on the signal meter may not match the (virtual) channel numbers on the TV.

In Seek mode, press the arrows to cycle through viable channels.

If looking for the best reception on a specific channel, press the Select button until the light is on next to "CHANNEL." Press the up or down arrows until at the desired channel. Rotate the antenna handle to find the strongest signal; the displayed signal strength will change as the antenna rotates.

To help improve a weak or overloaded signal for a channel, adjust the gain in Gain mode. The factory default is 10. Generally, 12–15 is the optimal setting.

If buttons are not pressed for three minutes, the signal meter will enter Sleep mode. The display and sound (if on) will turn off.



# Sensar Replacement Parts & Upgrade Kits

## Sensar Antenna Replacement Parts

RVW-205 Amplified antenna head for Sensar IV with integrated Wingman

RVW-205B Amplified antenna head for Sensar IV (black) with integrated Wingman

RV-2005 Amplified antenna head for Sensar III

RP-2900 Elevator tube assembly kit

Includes: 2 elevator tubes, 2 grommets, 4 pins, 4 retaining rings, 1 rubber bumper, 1 self-drilling screw

RP-2000 Leveling mount assembly kit for pre-1990 models

Incl: 1 leveling mount, 4 spacers, 2 pins, 4 retaining rings

RP-0154 Boot (only needed for Sensar I and II antennas)

SA-1001 Preassembled mount, directional handle and ceiling plate

RP-3000 Elevating Gear, poly bagged

RP-4000 Worm and shaft assembly

RP-4014 Worm gear and 14" hex elevating shaft with washers

RP-2049 Gear housing assembly kit

Incl: 1 gear housing, 2 pins, 1 bearing, nuts, 1 O-ring seal, 1 retaining ring

RP-3523 Baseplate boot assembly kit

Incl: 1 base plate, 10 screws, 1 rubber boot

RP-6200 Directional handle assembly kit (ivory)

Incl: 1 directional handle, 1 ceiling plate, 4 screws, 1 spring, 1 decal

RP-6300 Directional handle assembly kit (ivory)

Incl: 1 directional handle, 1 ceiling plate, 4 screws, 1 spring, 1 decal

RP-6795 Elevating crank kit (white)

Incl: 1 crank, 1 set screw (hex shaft)

RP-6822 Spring

RP-2658 Nylon Bearing

RP-5895 (ivory) / RP-6795 (white) Crank and screw set

RW-2000 Roof wedge

IW-5012 Interior wedge

EK-1036 Directional handle extension

## Upgrade Kits

The Wingman antenna is available as an upgrade kit for Sensar II or III antennas. The Wingman antenna optimizes the antenna for UHF reception, increasing performance up to 100%.

### Wingman Antenna Replacement Kits

RP-RV04 Four push rivets for Wingman antenna

The Rayzar Air retrofit kit utilizes the existing Sensar boom assembly or comes with a shorter 16" boom.

### Rayzar Air Antenna Replacement Kits

RVRZ25W (white) / RVRZ25B (black) Rayzar Air retrofit kit

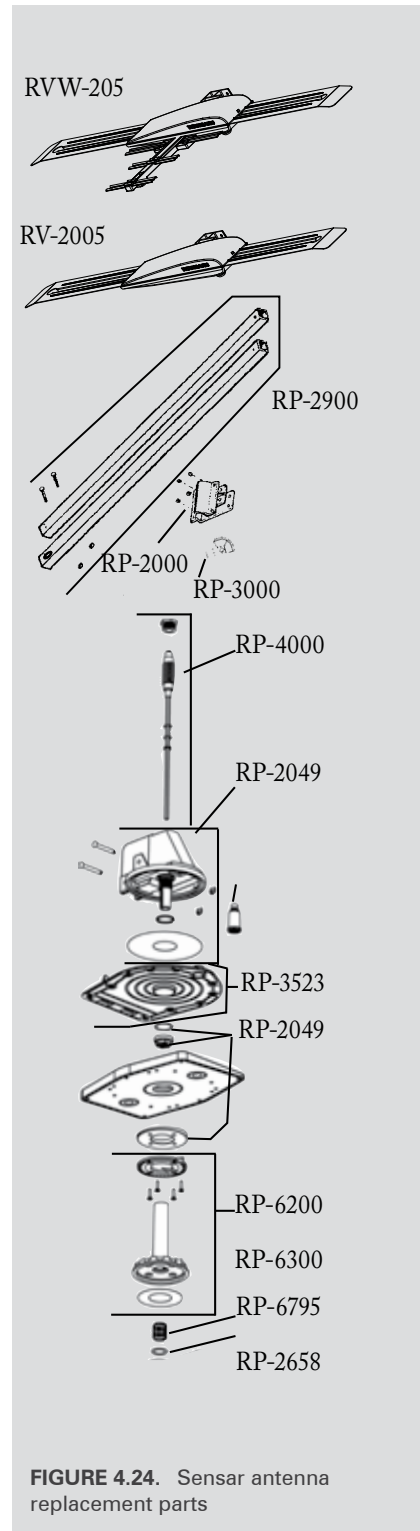


FIGURE 4.24. Sensar antenna replacement parts



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